

*What Is Claimed Is:*

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1. A method of inducing pulmonary vasodilation comprising:  
introducing a vector comprising a nitric oxide synthase gene operably linked to an expression control element into the lungs of a patient in need of pulmonary vasodilation;  
wherein the introduction of said gene into the lungs of said patient results in pulmonary vasodilation.
2. The method of inducing pulmonary vasodilation as claimed in claim 1, wherein said nitric oxide synthase gene is the endothelial nitric oxide synthase gene.
3. The method of inducing pulmonary vasodilation as claimed in claim 1, wherein said endothelial nitric oxide synthase gene is transduced into the lungs of said patient in a viral vector.
4. The method of inducing pulmonary vasodilation as claimed in claim 3, wherein said viral vector is an adenovirus vector.
5. The method of inducing pulmonary vasodilation as claimed in claim 4, wherein said viral vector is AdCMVceNOS.
6. The method of inducing pulmonary vasodilation as claimed in claim 3, wherein said viral vector is transduced into the lungs of said patient as an aerosol.
7. The method of inducing pulmonary vasodilation as claimed in claim 3, wherein said pulmonary vasodilation does not significantly affect systemic blood pressure or cardiac index.

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8. A method of treating pulmonary hypertension comprising overexpressing nitric oxide synthase in the lungs of a patient in need of treatment by introducing the nitric oxide synthase gene into the lungs of said patient.

13 9. The method of treating pulmonary hypertension as claimed in claim 8, wherein said nitric oxide synthase gene is endothelial nitric oxide synthase gene.

10. The method of treating pulmonary hypertension as claimed in claim 9, wherein said pulmonary hypertension is primary pulmonary hypertension.

11. The method of treating pulmonary hypertension as claimed in claim 9, wherein said pulmonary hypertension is secondary pulmonary hypertension associated with cardiac or pulmonary disease.

12. The method of treating pulmonary hypertension as claimed in claim 9, wherein said endothelial nitric oxide synthase gene is transduced into the lungs of said patient in a viral vector.

13. The method of treating pulmonary hypertension as claimed in claim 12, wherein said viral vector is an adenovirus vector.

14. The method of treating pulmonary hypertension as claimed in claim 13, wherein said adenovirus vector is AdCMVceNOS.

15. The method of treating pulmonary hypertension as claimed in claim 12, wherein said viral vector is transduced into the lungs of said patient as an aerosol.

16. The method of treating pulmonary hypertension as claimed in claim 12, wherein said treatment does not affect systemic blood pressure or cardiac index.

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17. A pharmaceutical composition comprising a nucleic acid encoding a nitric oxide synthase operably linked to an expression control element and a means for transducing said nucleic acid into pulmonary tissue.

18. The pharmaceutical composition as claimed in claim 17, wherein said pharmaceutical composition further comprises an effective concentration of at least one drug selected from the group consisting of an immunosuppressive agent and a phosphodiesterase inhibitor.

19. The pharmaceutical composition as claimed in claim 18, wherein said nitric oxide synthase gene is the endothelial nitric oxide synthase gene.

20. The pharmaceutical composition as claimed in claim 19, wherein said composition comprises AdCMVceNOS in admixture with a pharmaceutically acceptable carrier.

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